Evaluation of bioassays for surface water quality monitoring

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Biographical Sketch of Author

From January 1, 2003 Peter Stoks is director of the Rhine Water utility association RIWA in the Netherlands, and acting director of the International Association of Waterworks along the Rhine IAWR. Until 2003 he was Head of the Water Quality Division and Member of the Directory Board of the Dutch WRK Water works. His main interests in Water management include policy development, monitoring and assessment, and early warning strategies.

Abstract

The River water utility association RIWA, is an organization in the Netherlands and Belgium in which the water utilities along the rivers Rhine and Meuse have been working together for over 50 years in an attempt to reduce the levels of pollutants in their source water. One of the instruments RIWA employs is a joint monitoring program in which chemical, as well as biological water quality variables are being studied. Historically, the Ames mutagenicity test has been part of the biological component in this monitoring network. At the national governmental water management level discussions about the pro's and con's of using effect-oriented tests in the assessment of discharges and in ambient monitoring have become increasingly important. Due to a growing aversion against the relevance of the Ames test (notably upstream), as well as for financial reasons a number of other biotests were, therefore, evaluated in a joint project with the national water authority, in order to obtain a better alternative test to obtain information about the potential genotoxicity of the source water.

The overall conclusion from these measurements is, that there is no single genotoxicity test capable of covering the broad range of effects observed. In addition, although a marked decrease in genotoxicity response was observed in both rivers over a 6 year period, there still appear to be distinct differences in genotoxicity response between the two rivers studied. These differences can be partly explained by the differences in chemical composition. In view of the different industrial developments within the Rhine and Meuse catchment areas this indicates that the effluents of waste water treatment plants should be investigated in more detail.